



# **Security of Supply II Electric Transmission System Reliability April 1, 2008**

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# T&D Operations



Who we are and what we do

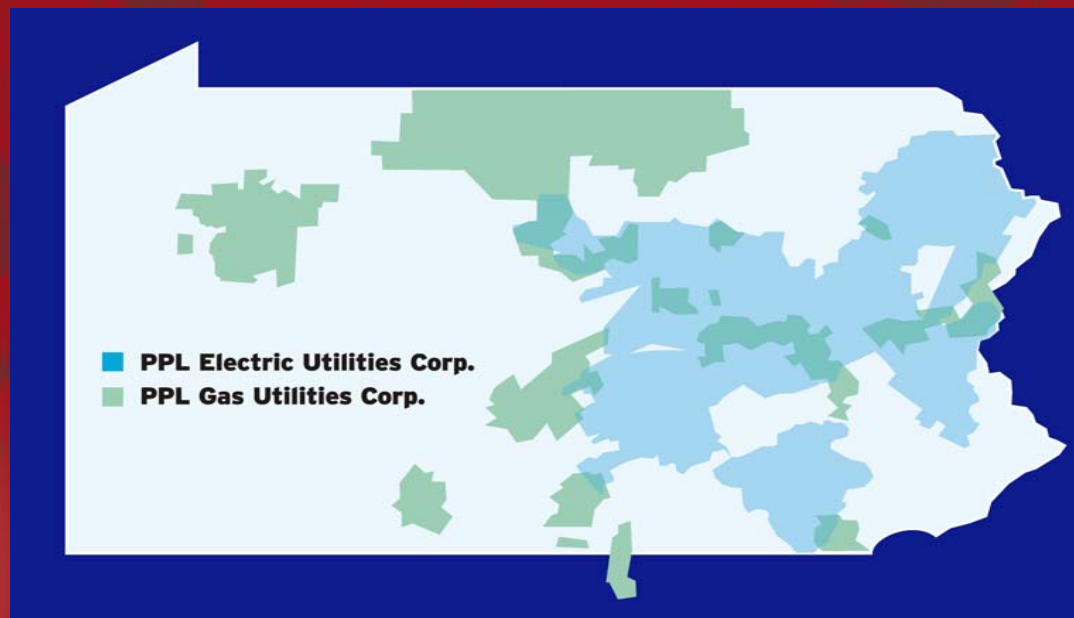




# Service Territory



- ❑ PPL Service Territory covers Eastern & Central Pennsylvania Including the cities of Allentown, Scranton, Harrisburg, Lancaster and Williamsport





# T&D Operations Staff



- T&D Operations – 2 components
  - 1) Transmission
    - 500 kV and above line, equipment and transformers
    - **6 Power System Dispatchers** operating at the Transmission Control Center (LEHSC)
    - 3 shifts, 24x7 coverage 365 days a year.
    - Also responsible for PPL's interface with the PJM Interconnection and external agencies.





# T&D Operations Staff



- 2) Distribution
  - 230 kV lines and equipment and lower voltages.
  - Divided into 5 Operating Regions
    - Harrisburg, Lancaster, Lehigh, Northeast, Susquehanna
  - Each Region staffed by 6 **System Operators**
  - 3 shifts, 24x7 coverage 365 days a year.
- We provide support for all prearranged jobs, emergency conditions, storms, etc





# T&D Operations' Job



- Our Main Objectives;
  - Be Safe
  - Keep the lights on
  - Improve something every day
- Our function is to have the “big picture” and direct efforts of the field crews to keep them safe and keep as many customers in service as possible.





# T&D Operations Tools



- Transmission Management System (TMS) Computers
- Better known as **SCADA**
- Allows remote control of devices.
- Provides device indication, alarming and data from substations





# T&D Operations Tools



- Multi-screen computer with alarm function, station one-line displays, control functions
- Windows-based program. Just point and click

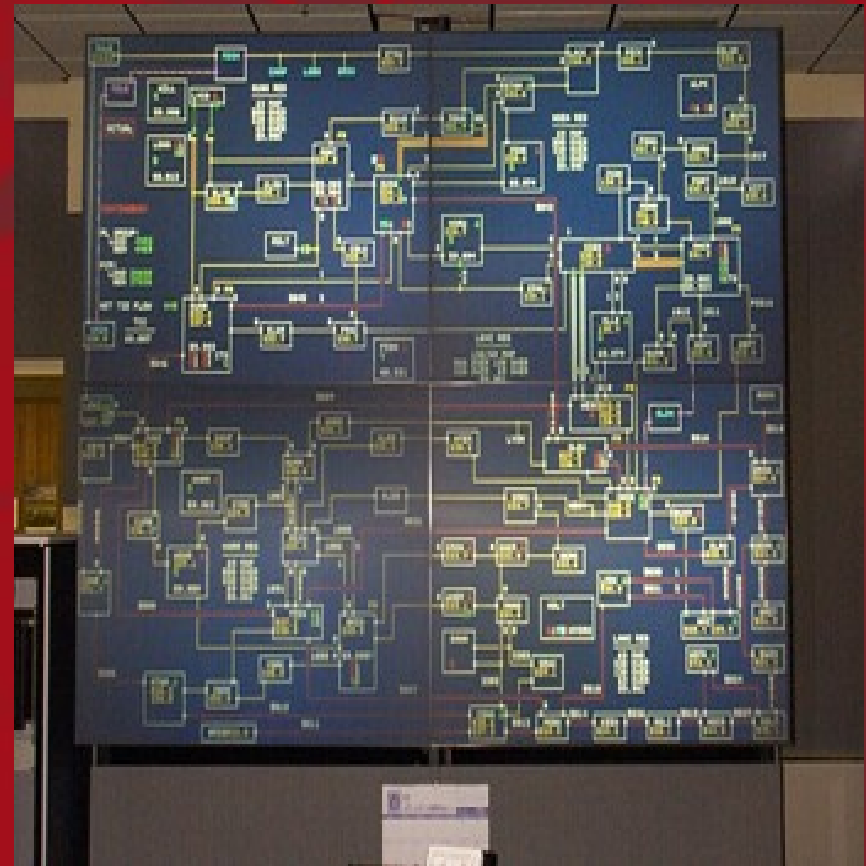




# T&D Operations Tools

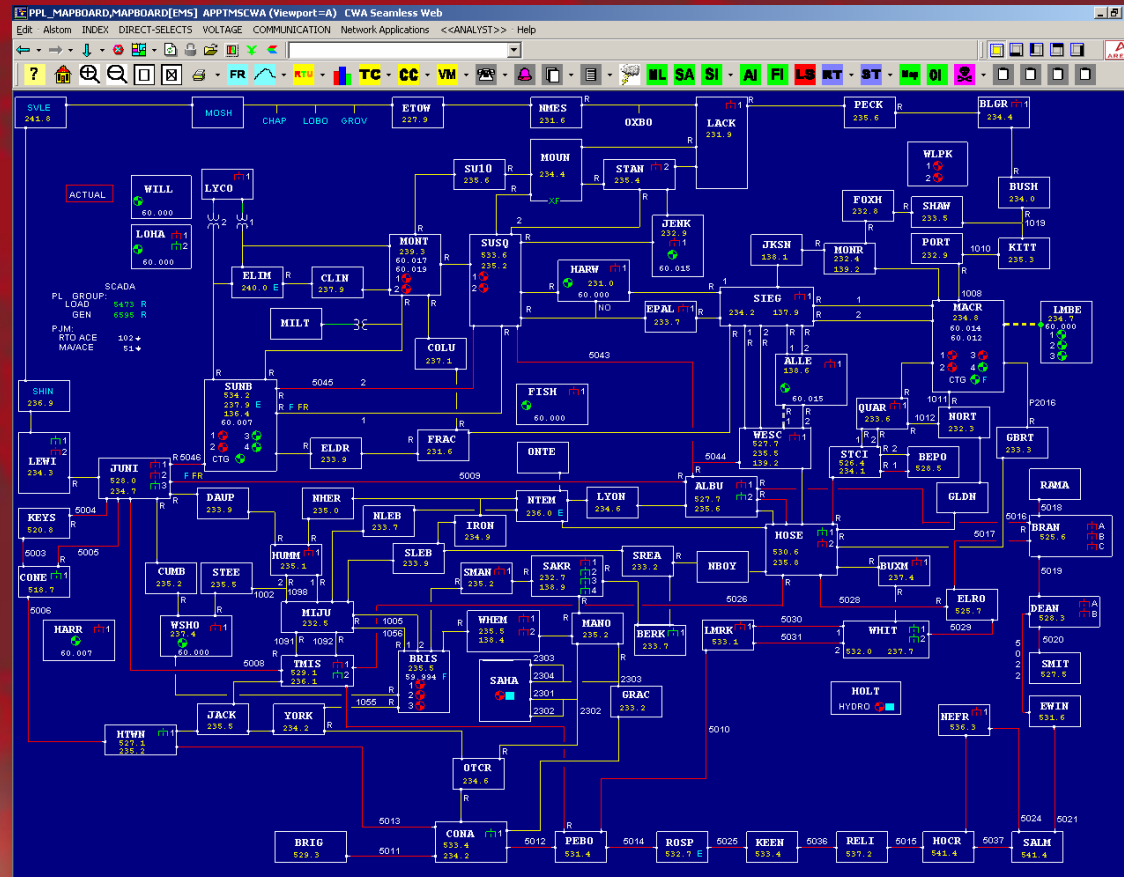


- Transmission Map board is a dynamic display system that constantly updates based on information from the TMS.





# Dynamic Mapboard





# T&D Operations Tools



- System Operators use a static map wall to represent the 12 kV system.
- Colored pins represent the status of field devices.
- Board is manually updated whenever a field move is issued.





# Operator Credentials



- Power System Dispatchers are required to obtain and maintain the following certifications;
  - NERC System Operator Certification
  - PJM Transmission Operator Certification
  - PJM Generation Operator Certification
- Many System Operators have some of the same Certifications, but they are not mandatory for SO's.





# Operator Training



- All PSD's / SO's are sent to annual spring training sponsored by PJM. The location and content vary from year to year.
- All PSD's / SO's attend an annual fall ppl training seminar here at the Lehigh SC.
- 2 annual Emergency Load Control Procedure Drills with PJM
- 2 annual Black Start Restoration Drills with PJM.





# Operator Training



- 3 person training staff to provide initial and on-going training for PSD's, SO's, and Supervisors, as well as other departments and companies
  - Classroom Training
  - Simulator Training
  - External Training
- In addition, T&D Ops provides SME support to administer annual Permit & Tag training sessions to MWF personnel.





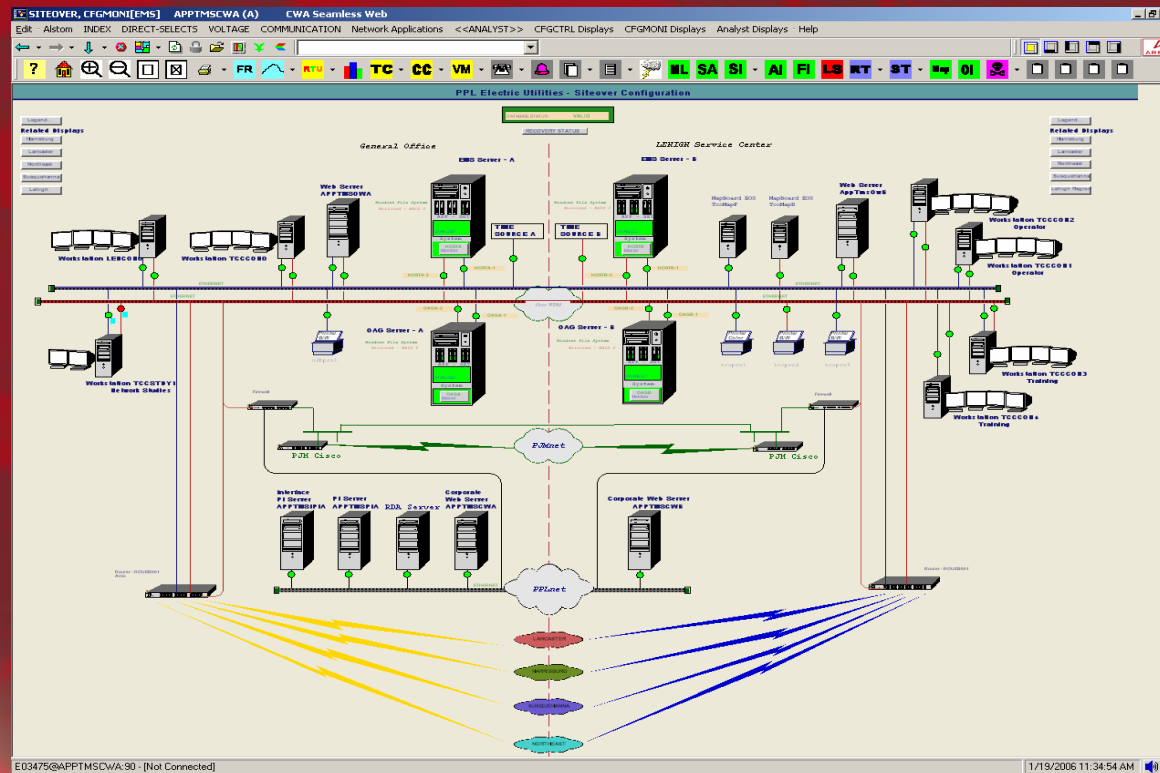
# EMS/SCADA Hardware Configuration Overview



- Primary Control Center
- Backup Control Center
- Tools and Applications



# EMS/SCADA Hardware Configuration Overview





# EMS Tools



- State Estimator
- Contingency Analysis - RTNET
- STNET





# Nuclear Power Plants



- Units in our footprint
  - Susquehanna Steam Electric Units 1 & 2
    - GE BWR Generation 3 design
    - ~ 1200 MW output each
- Voltage support requirements
  - Special voltage monitoring schemes in EMS
- Coordination
  - Weekly teleconference to discuss system impacts
- Communication Protocol – PJM instruction





# PP&L and PJM Relationship



- PJM has primary responsibility for all reliability functions related to the transmission system.
  - PJM EMS has a monitoring function but no control
  - PL operates the system under PJM direction
- PPL EMS programs function as a “double-check” or backup in case PJM systems fail.

